

# **Learners Experiences of E-learning Synthesis Report:**

## **Explaining Learner Differences**

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# 1. Introduction

## 1.1 Background

This report synthesizes the findings from the projects funded under the second phase of the JISC Learner Experience of E-learning programme. The purpose of this programme of work has been to further our understanding of how learners experience learning with technology and to make recommendations on how best to support learners through their learning journey.

Prior to this programme of work, most of the studies of e-learning in the published literature were evaluations of courses or specific technology (Sharpe *et al.*, 2005). Such evaluations are valuable in helping teachers to understand how to use technologies in pedagogically sound ways, however, they do not uncover how learners make use of technology outside of the course setting. The Learner Experiences of E-learning strand took a learner-centred and holistic approach to its research, which aimed to capture the richness and complexity of learners' experiences in their own words.

The first phase (2004-6) funded a literature review (Sharpe *et al.*, 2005) and two research projects (Conole *et al.*, 2007),(Creanor *et al.*, 2006), which established that:

- Technology use is pervasive and integrative. Learners make frequent use of technology at home and within their learning institution.
- Learners are living complex and time constrained lives, and hence they value efficient and flexible access to online course materials.
- Learners primarily use technology in order to access information, the dominance of Google and Wikipedia in everyday life is reflected in the choices learners make about how to find information.
- Similarly, personalisation and choice are core elements of technology use in learners' everyday lives that they expect to transfer to their study.
- Learners are involved in an underworld of informal learning, making use of using social networking sites and instant messaging systems.
- Learners' experiences are diverse. While there are some generalisable differences, there are an awful lot of individual differences.

These findings are well summarized in the Briefing for Phase 2 projects (JISC, 2007a) and further illustrated with examples in the In Their Own Words publication (JISC, 2007b). The Phase 1 studies have provoked an enormous amount of interest, with 13,000 copies of *In their Own Words* being distributed and 220 attending workshops disseminating our findings.

There was a need then to replicate their results, to give us confidence in them with more students. We also hoped to explore in greater depth some of the issues thrown up in Phase 1, such as the impact of the learning context, the possibility of distinctive technology-related issues belonging to specific groups of learners, and changes in beliefs, attitudes and practices over the learning journey.

## **1.2 The Phase 2 projects**

Seven projects were funded in Phase 2 (2007-2009). They are summarized below using extracts from the project completion reports, which are available from the [Learner Experiences of e-learning website](#) (JISC, 2009)

The **STROLL** (Student Reflections on Lifelong e-Learning) project examined the changing nature of the student learning experience with technology over a two year period, which covered, either the period of transition from a Foundation Degree at Hertford Regional College to the University of Hertfordshire, or the first 18 months as undergraduates at the University of Hertfordshire. Data were collected through video or audio diaries recorded for a week at a time at approximately six monthly intervals. Interpretation of the diary data was supported by telephone interviews and focus groups. Edited video diary extracts are available at the project website, along with summary mind maps of quotes from students. The project has produced written reports on their methodology, analysis of findings and recommendations for institutional managers.

The **Thema** project set out to investigate the experiences of taught Master's students at Oxford University, with specific reference to the role of digital technologies in supporting their academic and social lives. The project conducted a baseline survey in order to establish the landscape of technology use by students across the whole University. The data for the case studies were collected using a variant of e-mail interviewing (the 'pen-pal' technique), and framed within two online surveys gathering data from a larger sample of students on the same programmes. The project has produced a set of engaging narrative accounts from 11 learners, including a number of international students, documenting their experiences over the first nine months of their courses.

The **BLUPS** (Students' Blending Learning User Patterns) study at the University of Northumbria at Newcastle investigated learners' blending of learning using technology within both formal and informal learning environments and the ways in which the university could provide teaching and learning support appropriate to these behaviours. Learners were interviewed and submitted logs of their learning and study habits with technology. From these data, six types of study patterns were described which outlined the choices learners made about where, when and how to study. The recommendations are likely to be of particular interest to those designing library and other learning spaces.

The **LEaD** (Learner Experiences across the Disciplines) project followed students throughout their first year at the University of Edinburgh in Divinity, Physics and Veterinary Sciences courses. The project examined the impact of technologies during this period of transition and changes in use over time. The project made use of the 2007 version of the survey of new students ICT use, which has been conducted by the University for a number of years. In addition, learners completed diaries in their preferred form, whether textual, audio or video. The project has produced written reports on their methodology and analysis of findings.

The **LExDis** (Disabled Learners' Experiences of e-learning) project took a user-centred participatory approach to the research. They worked with learners with disabilities at the University of Southampton to produce rich descriptions of their experiences and documented a diverse range of strategies making use of technology in assistive and innovative ways. The project produced a methodology report, a final project report, guides for staff developing accessible e-learning materials and a searchable database of learner strategies.

The **E4L** (E-Learning for Learners) project attempted to purposively sample proficient e-communicators from the University of Northampton using a set of basic online tasks. These learners subsequently took part in an interview which made use of a personal education flowchart and product card sort as guided recall techniques. The project has published the coding framework which was used in the analysis of interviews and a collection of interactive case studies which make use of video clips and transcripts from the interviews.

The **PB-LXP** (Learner Experiences of Blended Learning in Practice Based Courses) explored the use of ICT on courses which require students to make use of their work and practice experience as part of their study. Students from six Open University courses in Health and Social Care, Computing and Business took part. The project used a carefully designed questionnaire which enabled them to explore factors in students attitudes to technology use. Students participated in a series of telephone interviews which revealed their perspectives on the benefits and challenges of using technology and the relationship between study and the workplace. The project has produced a report on the survey data, 14 case studies from individual learners and an integrative overlay which includes guidance for course developers.

### ***1.3 Learners involved in the studies***

We looked at learners from HE, FE and work based learning. In total, these projects involved 186 learners in some form of sustained engagement over an extended period, such as interviews, audio or video diaries, or production of case studies. In addition, 2921 learners participated in the surveys conducted by the LEAD, Thema and PB-LXP projects. The detailed breakdown of the 186 learners is given in Tables 1 and 2. Projects were encouraged to collect this basic profiling data in similar ways, although there were some variances between the projects noted in the footnotes to the Tables. Table 1 shows that most learners were of typical age for undergrads (medians 18-23) and postgrads (Thema median 25), although learners in PB-LXP who were studying practice based courses part-time at a distance were noticeably older (median 38).

Table 2. Summary descriptive statistics of learners who participated in each project

		Programme			By project (no / % of the programme total)					
		Number	% of total	e4L no / %	BLUPS no / %	Lead no / %	LexDis no / %	PB-LXP no / %	STROLL no / %	Thema no / %
Gender	Male	74	40	5 (3%)	8 (4%)	8 (4%)	14 (8%)	14 (8%)	19 (10%)	6 (3%)
	Female	112	60	12 (6%)	11 (6%)	12 (6%)	16 (9%)	11 (6%)	34 (18%)	16 (9%)
First Language <sup>1</sup>	NOT English*	24	13	No rec	8 (4%)	No rec	2 (1%)	8 (4%)	5 (3%)	1 (1%)
Programme level <sup>2</sup>	Foundation	9	5		1 (1%)				8 (4%)	
	UG yr 1	44	24	6 (3%)	3 (2%)	20 (11%)		1 (1%)	14 (8%)	
	UG yr 2	34	18	2 (1%)	5 (3%)		6 (3%)	9 (5%)	12 (6%)	
	UG yr 3	33	18		5 (3%)		10 (5%)	5(3%)	13 (7%)	
	UG yr 4	8	4		1 (1%)		4 (2%)		3 (2%)	
	PG	47	25		4 (2%)		10 (5%)	10 (5%)	3 (2%)	22 (12%)
	FE	12	6	3 (2%)					8 (4%)	
	ACL	6	3	3 (2%)						
	Not currently in Ed	3	2	3 (2%)				1 (1%)		
	P/T	62	33	4 (2%)	1 (1%)		27 (15%)	23 (12%)	2 (1%)	6 (3%)
F/T	108	58	10 (5%)	18 (10%)	20 (11%)	3 (2%)	1 (1%)	51 (27%)	16 (9%)	
Employment status (hours per week) <sup>3</sup>	0	61	33	5 (3%)	8 (4%)	No rec	28 (15%)	1 (1%)	14 (8%)	9 (5%)
	<10	23	13	4 (2%)	0	No rec	1 (1%)		11 (6%)	7 (4%)
	<30	19	10	3 (2%)	5 (3%)	No rec	0	3 (2%)	8 (4%)	2 (1%)
	30+	51	27	5 (3%)	6 (3%)	No rec	1 (1%)	21 (11%)	19 (10%)	4 (2%)
Accessibility <sup>4</sup>	Declared <sup>5</sup>	37	20	3 (2%)	3 (2%)	No rec	30 (16%)	2 (1%)	2 (1%)	0

1 no returns from E4L, LEAD

2 STROLL 8 Foundation and 8 FE are the same students

3 No returns for LEAD; STROLL part time status not recorded so distributed roughly evenly

4 No returns for LEAD

5 Dyslexia=5, Mobility=9, visual, impairment=5, hearing imp=1, mental health=4, other=7

Table 1: Numbers and ages of participants participating in each of the projects

	No. of participants	Age		
		Mean (SD)	Median	Range
E4L	17	25.5 (8.2)	20	18-48
BLUPS	19	24.1 (6.5)	21	19-42
LEaD*	20	21.8 (7.6)	18	18-43
LeXDis	30	26.6 (10.7)	23	20-71
Pb-lxp	25	40.4 (8.8)	38	23-59
STROLL	53	23.0 (6.5)	21	18-52
Thema	22	29.3 (12.1)	25	22-73
<b>Total</b>	<b>186</b>	<b>26.9 (10.4)</b>	<b>23</b>	<b>18-73</b>

- Using medians of 5-year age intervals used by LEAD

## 1.4 Overview of Methods

The programme aimed to gather thick descriptions of learners' uses of technology and to understand their technology use in a holistic way, i.e. not so much how learners use technology for study as how they use technology throughout in lives while in education. To achieve these aims each project adopted a mixed method approach, employing a variety of data collection techniques. The primary data collection method was some form of interviewing or diary keeping. However Thema, LEaD and PB-LXP, conducted large-scale surveys, showing how to successfully integrate quantitative and qualitative data to achieve breadth and depth in findings.

The techniques developed by the projects to engage learners in a productive dialogue and record keeping elicited rich descriptions of use and the attitudes and beliefs operating behind their actions. Interviewing techniques such as interview plus, where learners refer to and explain a piece of work they have produced or are working on were pioneered in this programme. Other innovative techniques include Thema's form of email interviewing called 'Pen Pals,' STROLL's video diaries, LEaD's audio/video diaries, E4L's interview technology card sort and LexDis's participant generated tips and strategies.

These methods were designed to help elicit tacit understandings and to do so at key moments or longitudinally. Learners talked about their conceptions of the learning process generally and we can now see how this underpins technology use. Examples of this are most startling where learners are at a point of transition in their developing conceptions, such as international students coping with a new style of education, or learners moving from further to higher education.

A variety of techniques were employed to maintain programme coherency across seven discrete projects. A Learner Profile form was developed for use by each project to help us gather baseline data about programme participants. Some of this data appears in Tables 1 and 2 above. The Synthesis and Support Project hosted four workshops for projects across the two-year programme focusing on programme themes, methods, analytical techniques and dissemination and findings. The Synthesis and Support wiki was used to maintain records of project findings mapped to themes

and projected outputs. Regular visits by Synthesis and Support team members to projects and half-yearly interim reporting combined to focus projects on programme level themes and outcomes.

Each project has contributed to the development of a rich online resource on techniques for evaluating learners' experiences, including a set of methods recipe cards and staff development/workshop materials. Guides and tools for analysing qualitative data were produced, as were resources on recruitment and retention of participants and gaining informed consent, especially in cases where audio/video data is being collected and may be used for dissemination purposes. More details of these and summaries of the project findings are on the [Learner Experiences of e-learning website](#) (JISC, 2009)

### ***1.5 Overview of Phase 2 findings***

It was found that nearly all students have access to a great deal of technology, not just that provided by their institution, but also their own laptops and mobile phones. The learner-centred research methods adopted here show that the concept of e-learning as course related technology provided by a learning institution provides only a narrow perspective of the technology use of learners today. Rather, learners are immersed in a technology rich environment and make use of the technology available to them in a wide range of different ways. While some learners feel disadvantaged by a lack of functional access to technology or the skills to use it properly, others are making deliberate choices to adopt sophisticated technology mediated learning strategies and ultimately, finding and using a range of tools in personalized, creative ways to support their study. Worthy of note are the quantity of different pieces of technology and resources accessed daily by the most technically adept students and the extent of the role of peers in providing technical, practical and emotional support, mediated through personal technologies.

The range of uses of technology described by learners can be categorized as:

- to allow access to learning flexibly to fit in with their busy lives (flexibility in time and location)
- to maintain social connections and support networks
- for entertainment and leisure activities
- to access information and resources efficiently and drawing on a wide pool
- careful, strategic uses to meet identified needs (e.g. discipline specific or personal)

Learners clearly articulated their expectations of institutions to enable them to use technologies in the ways described above. They have high expectations of institutions to provide robust, reliable and accessible technology. For some, such as learners with disabilities, having access to electronic materials which can be personalized, is an essential requirement to enable them to participate in learning. Indeed, where technology use followed a real need, its use was at its most sophisticated, some disabled learners standing out as agile adopters of technology who understood the affordances of the technologies they chose.



However, beyond these expectations of service provision, and despite using technology extensively in their social and leisure lives, most learners do not have clear ideas of how courses could be using technology in educational and innovative ways. In the main they still rely to a great extent on their institutions, course pedagogies and tutors for guidance and direction.

Many of the projects followed learners over some period of time, ranging from a few weeks to 18 months, and there is evidence of some developing maturity of technology use. These changes over time and the influences of a range of contextual factors may explain the variation we see in experiences between learners.

## **2 The Learner's Journey**

There is now data from longitudinal studies, including periods of transition, which allows an examination of how learners experience change in technology use over time. The LeAD and STROLL projects focused on the issues of change and transition into university as undergraduates and the Thema project on the transition to postgraduate study. This section examines how learners' relationship with technology changes, starting with the expectations and attitudes of new arrivals.

### **2.1 Experiences at arrival**

There is agreement that the majority of learners arrive at university confident, positive and enthusiastic about their use of technology (LeAD, 2009). (STROLL, 2009); (LexDis, 2009). The projects that conducted surveys show that most learners arrive with their own personal technology, notably laptops and mobile phones. These surveys also show that there are differences between institutions:

- 94% of University of Edinburgh students arrive with own computer, mostly laptops (90%) (LeAD)
- 90% of Oxford University Master's students own their own laptop. (Thema)
- 74% of the STROLL project participants (University of Hertfordshire and Hertford Regional College) have their own computer.

One of the real benefits of approaches adopted by these studies is the ability to compare such survey data with expressed experiences. Here we see for example that, learners aren't very accurate in self rating confidence/competence with computers (E4L), that owning a laptop isn't the same as having a usable one:

*My laptop isn't used for going on the internet as I've had it for six years which is .. useless. All I can do is word processing* (Hardy, 2009, p. 16)

The confidence with and access to technology means that learners expect to be able to use it as they arrive. Indeed LeAD pointed out that technology has made the entry to university more 'fuzzy' as students view the uni website when choosing university, access the portals prior to arrival and find Facebook groups for their courses and accommodation. Learners like to be networked as soon as they arrive (LeAD, Thema).

The minority who lack access to personal technology or who are apprehensive about using technology are in need of support. We have talked about the digital divide become narrower but deeper. We heard these learners express surprise that so much is now online and feeling disadvantaged by their lack of access.

In line with the findings of the JISC Great Expectations study (link), we find that most students on arrival at university have little idea about how to use technology in ways which support their study (LeAD), have not explored the full functionality of the technology they own (STROLL) and have few expectations about how to use web 2.0/new media (Thema). Indeed, LeAD found that learners are conservative in their study approaches and habits generally, and we suspect this extends to their use of technology. This does seem to improve over time and both Thema (master's courses) and PB-LXP (practice based courses, older learners) were able to give examples of learners understanding the benefits of using technology to improve learning.

## **2.2 Changes in technology use over time**

The main change over time is a simple increase in use of technology for study. Learners note increased time spent using computers for study related activities and dependence on the main technologies provided for them such as the university VLE (STROLL) and the digital library (LeAD), which results in improved confidence over time (STROLL). The PB-LXP project noted that such increased confidence was a result of using technology extensively on their course, and that 'students who did not start off with very high ICT skills all reported increased confidence and in general a greater willingness to use ICT' at work and home (PB-LXP).

In terms of changes in use of specific technology, learners described increased use of online academic information sources and discipline specific technology, e.g.

*My learning has changed mainly because it's gone from physical to digital.. from using pencils to do my drawing to using different mediums like Photoshop, Flash and my pen tablet. (Jefferies et al, 2009, p. 14).*

Over time, learners increasingly make more mature decisions about which technologies to use to meet a particular need (STROLL) and adopt a more thoughtful and critical view of the use, or lack of use, of technology on their courses (LeAD).

One of the programme aims was to look for critical moments which led to changes in technology use but all projects reported that these were very difficult to elicit from learners. Perhaps the only examples were from LeXDis where disabled learners received assistive software and/or hardware.

## **2.3 Information skills**

First, a development in information seeking and handling skills. As we would hope from university students, learners described an increase in the use of online journals and academic search engines over time and more importantly, a development in their skills in using them. (STROLL)

*I have used the Internet a lot more this year than I did last year, especially for finding more academic research. Such as journals, I've learnt how to use Google*

*Scholar, which I didn't even know existed until I came here. ([Jefferies et al., 2009](#), p.17)*

By postgraduate level, there were some really impressive skilled examples of using technology to handle information. One of the Thema case studies described Madeleine's use of combination of tools to help her find, evaluate and keep track of information. She used [PubMed](#), Google and [Wikipedia](#) (with care) for searching, newsfeeds for keeping up to date and [Zotero](#) and its Firefox plug in for storing and sorting references:

*I kind of trust Wikipedia when the article is not a stub, and as regards Google, it depends on the results I am given, of course. If the websites look too personal and not trustworthy and scientific enough, I try to find a better source or at least another source which supports the facts provided by the non-reviewed resource.*

It's worth noting that information skills isn't just about journal articles, it's about access to the whole world wide academic sources e.g. listening to podcasts from US Universities (BLUPS), taking courses at MIT (STROLL) or:

*I had to learn Excel the other day for a directed activity. I found the lecture hard to follow so I went on You Tube and found a video on setting up a formula. ([Lottie, LeXDis Case Study](#)).*

## **2.4 Learning skills**

Second, learning skills development, learners talk about being more independent as learners over time, especially through the FE to HE transition:

*Your learning skills are going to be different because they're not going to spoon feed you the work. You have to do I think forty hours a week of independent studies. From further education to higher education you're the one doing the learning (Jefferies et al., 2009, p. 15).*

Although not of direct relevance to this programme of work, many of the projects, Thema in particular, recorded and commented on the development of learning skills and strategies over time, irrespective of technology use. However, in one case study from Thema, [Ellen](#) talked about the interaction between her technology use and ways of thinking and organizing herself. She described the change over time from using mostly word processing software to organizing her notes and thoughts to using spreadsheets:

*All of a sudden I went from being a Word person to being an Excel person, and it was like this weird almost paradigm shift of 'I'm no longer just bound to being a liberal arts student, I'm a researcher now, I can think scientifically and think about organizing my thoughts and my data in such a way that you can see this here and then it correlates with this'. And now that I've done that I don't think I can ever go back.*

PB-LXP pointed out a number of examples of their learners articulating improvements to their study through using technology to make their learning strategies more practical and active e.g. use of the wiki to upload notes which 'sparked a more active and reflective study process' ([Amy case study](#)), use of drawing tool to create revision

maps to improve exam preparation ([Brenda case study](#)), audio and video course materials making learning more interactive ([Brian case study](#)).

## **2.5 Organizational skills**

Learners lead complex, time pressured lives and consequently they noted that they had needed to develop organization skills to help them manage the multiple demands of study with home, family and employment (STROLL, BLUPS, PB-LXP, LeAD). The use of technology to aid flexible study emerged as a key theme in PB-LXP, as might be expected from a project looking at the experiences of learners in work taking courses at a distance. However, traditional undergraduate learners in the other projects also spoke of how important convenience and flexibility are and how they value technology that allows them to access online resources flexibly. The main example is institutional VLEs which act as a one stop shop – particularly where they can be personalized for their use (STROLL STudyNet and LeAD MyEd). Other examples downloading podcasts to listen to in the car (STROLL), copying materials onto memory stick & PDA (Frank, PB-LXP Case Study).

On the flip side, learners express dissatisfaction with poor, inconsistent use that wastes their time. Where the institutional provision is not satisfactory, we saw examples of learners reverting to using their own personal technologies to save them time e.g.

*[my favourite piece of technology is] my phone, because I record lectures. I am more likely to watch what I have recorded than to log on the [VLE] and to go through the long procedure of finding something (E4L).*

The need to develop new approaches to the organization of study was a recurrent theme in the projects concerned with times of transition. New undergraduates reflected on the increased time demands of higher education compared to their previous college (STROLL) or school experiences (LeAD), and new Master's students described their struggles to plan their time around working independently without the structure and regular feedback provided in their undergraduate degrees (Thema). Examples of technology helping were using RefWorks to record independent reading ([Elisabeth, Thema case study](#)), and using mobile phone voice memos for personal reminders (LeXDis).

Of course, sometimes the technology places additional demands on time rather than helps. The Thema project shared examples from learners of deliberately restricting time on Facebook to an hour in the evening ([Ellen case study](#)), not wasting time between lectures to surf the internet (LeAD) or unplugging the Ethernet cable when needing to get work done!

As with many things, what is a minor inconvenience for some is a total barrier for others. The LeXDis project reports that time is a constraint and persistent worry for disabled learners. Where most learners express a desire to be able to access learning materials out of hours, off site and on their own computer, for disabled learners, these often are essential requirements to enable them to study.

### 3. Learners in context

Despite our determined focus to take a holistic approach to examining learners' experiences, rather than looking through the lens of the course or tutor, learners continue to raise these and other contextual factors as important influences on their uses of technology. Bearing in mind the research designs of these projects, we are not aiming to make judgments about the relative impact of each of these factors, but to understand *how* they impact, through examining the rich descriptions collected.

#### 3.1 The social context: home, leisure and friends

Having reported in Phase 1 that today's learners are immersed in a technology rich world, we were looking to examples of how such technology use at home influenced study. The projects report many vivid descriptions of such pervasive technology use e.g.

*Technology is a big part of my life, both in working and playing. The first thing I do in the morning is to switch on my TV and computer because I have to check my emails. (STROLL)*

*My whole life is on my laptop: pictures, music, every Word document I've created since high school is on here. (Thema)*

Learners made use of family members e.g. using a partner's sign on a different university to access their e-journals (BLUPS), gaining help from children to download podcasts (STROLL) or getting technical support from family members ([Ellen, Thema case study](#), Hardy et al, 2009)

Without doubt, learners rely a great deal on technology to maintain their social networks, with Facebook, MSN Messenger, Windows Live Messenger being mentioned alongside the ubiquitous mobile phones. Learners were rarely able to see how such familiarity with technology was influencing their study habits. Take for example the influence of social networking sites such as Facebook. When asked directly about the role of educational institutions on these sites, most learners were clear that they wanted to keep such personal spaces to themselves. However, there were very many examples, across most projects, of learners using online social networks in helpful and supportive ways. The project that didn't report such online networking was PB-LXP where learners tended to use the technology provided by the course (Flash Meeting or wikis) to work collaboratively. These learners were in general much more focused and strategic about their technology use, and of course were older and in full time work. Nevertheless, some of the more experienced PB-LXP students used Skype and specialist software not specifically recommended by their course.

Students away from home make use of communication technologies to stay in contact with their friends and families back home including, email, social networking and keeping blogs. This gives a real sense of connection and closely, illustrated beautifully by [Liling \(Thema case study\)](#) who communicates with her family in China daily and says

*I'm kind of an internet maniac because I don't feel safe if I can't get online ... I moved three times since I came here and on the first night I really cannot get the internet at first. And then I just feel so empty.*

### **3.2 The work context: employment and practice**

It can be seen from Table 2 that many learners take paid employment while they study and they articulated how this influenced their technology use. The main way is that working places additional time pressures on students and we noted in the previous section how convenience, flexibility and accessibility are expected and valued (Lead, Pb-lxp). One of the BLUPS case studies gives a rich description of learners in employment where time on campus consists of tightly focused, strategic information gathering activities (BLUPS, 2009)

Learners also talked about how their expectations for what institutions should provide were formed by experiences at work, particularly expectations for robust systems and up to date software (PB-LXP).

The PB-LXP study was designed to look specifically at the nature of the relationship between work and study. In their carefully designed questionnaire study, they found that perception and use of ICT was driven by the work experience.

PB-LXP, in their questionnaire, looked at whether perceptions about technology predicted self reported use. They found, using linear regression models, that perceived usefulness at work was the best predictor of both amount and diversity of ICT use. Students who think technology is more useful in their work context are more likely to use technology more often and use more types of technology.

### **3.3 The course context: pedagogy, disciplines, tutors and peers**

Learners explain some of their technology use by referring to the demands of their courses (PB-LXP, Thema, BLUPs). For example [Hashini \(Thema case study\)](#) talks about her engagement in planned, tutor led online discussions, Amy from PB-LXP talks about uploading notes to a course wiki as part of the course requirements and LEaD reports on clickers in the classroom.

There were two other less obvious links between course demands and technology use. First, where courses require students to work in groups, students make significant use of communication technology (largely mobile phones, email, instant messaging services and social networking sites) to support the process of groupwork, often in combination with face to face work e.g. rather nice, unusual example from STROLL:

*One of the group members was not able to make it today so what we did we were connected by using MSN Messenger so we were discussing notes. We were feeding back to the other person. (Jefferies et al, 2009, p. 16)*

Second, is the less clear, but perhaps more interesting influence of discipline rather than course per se. PB-LXP in their questionnaire study with 3 factors (usefulness, ease of use and motivation) found that sociology students generally find ICT on their courses less useful and less easy to use than students on either Business or Technology courses. However, these differences disappear when asked the same questions in

relation to using ICT for leisure and social activities. Here for leisure activities, students perceived ICT similarly easy to use and useful irrespective of the course they were taking. This suggests that it is not that students who take sociology courses as less skilled/confident as people, but the influence of the technology demands of the courses they are taking.

Lead found little evidence of differences in information sources between students on different courses, other than the obvious one that different disciplines refer to different journals and databases. Google and Wikipedia are used by everyone. Physics students seemed to use journals less than divinity and veterinary students.

A final example of the influence of discipline is where students have a notion of themselves as a emerging professional community of practice, and make use of technology to keep in touch, beyond the boundaries of the course e.g. [Hashini \(Thema case study\)](#) building an international professional network of human rights lawyers and students taking Veterinary Science making use of social networking sites because they have some identity as a professional cohort (LeAD).

Alongside the influences of friends, family and peers discussed previously, tutors play an important role in determining technology use. Learners use technology recommended to them by their tutors, because they trust them to know best, and may be reluctant to look elsewhere (E4L). As well as recommending specific tools and resources, there are practices that tutors demonstrate which influence learners, such as responding promptly to e-mails or allowing their tutorials to be audio recorded, as in the following examples, both from the BLUPS project:

*I contacted one of my tutors via email to ask if she would cover that in one of the revision classes this week. I could have waited until I next saw her, but e-mail is such an effective means of communication and it meant that she would be able to prepare something beforehand, instead of me just turning up to the next lesson with my problem.*

*Had a phone tutorial with my supervisor referring to a support document he emailed to me – I digitally recorded the tutorial and saved it as a digital file on my laptop. This has then been playing while I make the adjustments to the document.*

There are anxieties from some staff about their lectures and seminars being recorded but these examples show how important it is to see it from the learners' point of view. By allowing such technology use, tutors actively enable better learning to take place.

Finally, one more thing learners get from a course is a cohort of peers. Peers play an important and underestimated role in learners' experience of technology use. Where Phase 1 reported an underworld of informal learning, supported by online networking, Phase 2 extends this to show that some students are making extensive use of peers to support the process of groupwork, for technical support, in preparing assignments and to maintain contact with their course cohort. This is a consistent finding across all projects and mostly occurs without any support from course tutors, e.g.

*I use a lot of MSN and forums to communicate with fellow students and teacher, where I can ask questions and discuss with my colleagues (Lead)*

*You chat to your friends on MSN to see if you missed anything if you don't go in.*



(BLUPS)

*The people in my course created a Facebook group where we discuss logistical stuff like availability of books or clarification of certain concepts or sometimes even, outlines of formats etc (Thema)*

*If there was a question I couldn't do and found no useful material on I used windows Live Messenger to discuss that particular question with friends.*

(STROLL)

The LeAD project reports an extreme example of such peer support for student who had to travel home regularly due to personal circumstances . “His fellow classmates decided to support him through these difficulties by recording all of the lectures that he would otherwise have missed. This was independent of adjustments made by the teaching staff. He used the travelling time to listen to these recordings, and so in this way no significant work was missed and he was able to complete the year successfully.” (Hardy, 2009, p. 24).

## **4. Individual differences**

We knew already that learners are not a homogenous group and some of the Phase 2 projects set out to examine the experiences of specific groups that are under-represented in previous work. Our understandings of the experiences of disabled and international learners have been significantly enhanced by the projects which have uncovered a great deal about their experiences.

Assumptions are often made about the influence of demographics and individual preferences in learners' experiences. Only one project, BLUPS, attempted to look at this directly and create a typology of learners. Actually this project talks of continuums of preferences rather than extremes, how preferences change in response to different situations and the typologies that came out were more to do with context than preferences. Similarly, although there is much interest in the influence of age, our findings are equivocal about its influence and appear to relate more to prior experience than age per se.

### **4.1 Age and experience**

Despite all the hype about the 'net generation' we did not find clear age differences. In their well designed questionnaire study, PB-LXP found no effect of age on perception of ICT. They also found no distinct pattern in technology use by age. However their sample was mainly older learners (see Table 2) containing so few in the 'net generation' that any possible generational differences might have been undetectable.

The LeAD survey of first year entrants did find some age differences in usage of different online services with some 'being very much the domain of younger students (instant messaging, online music and social networking) whilst others were more age independent (online purchasing) (LeAD).



STROLL commented that the time of transition 'is a critical time for all students regardless of age and background' (Jefferies *et al.*, 2009, p.7), and went on to explain that it is not age per se that makes the difference but prior experience, well expressed by one of their participants

*The biggest change in learning I experienced will be because it's been such a huge gap between present education as a student and my previous one, technology has moved on so far from research done in the library with books with no on line facilities, now [its] at the click of a finger. (Jefferies *et al.*, 2009, p. 14)*

Similarly, LeAD concluded that 'skills don't belong to a particular generation; learners learn from each other where they perceive a need' and that differences between learners are not due to age or gender but from their previous experiences of home, work and school (LeAD Completion Report, p. 3). LeAD give some good examples of the whole range of prior school experiences from 'we never had computers at school' to 'we had our own school intranet which was like webCT' (Hardy, 2009, p.11-12).

Interestingly, even though we find little evidence of real age differences, there is still a perception of their age as a disadvantage from older students e.g.

*The younger members had more experience of modern technologies and prompted those of us who had little or no experience, whereas my experience was in more traditional methods, such as buildings recording and I helped demonstrate the methodology of that. (Thema)*

## **4.2 Specific learning requirements**

There was lots of evidence that learners choose technology to meet a particular need and this extended to coping with specific learning requirements. For example:

- international students made use of online dictionaries, and software in their native language (Thema, LeXDis)
- students with dyslexia spoke of their preferences to listen to podcasts rather than read (BLUPS) and their reliance on online dictionaries (LeXDis)

Students with disabilities face the greatest challenges in meeting their specific learning requirements. However, this was the group that seemed most able to use technology to their advantage. The LeXDis study described disabled learners as 'agile adopters' of technology who were able to make good choices based on their understanding of the affordances and properties of technology better than most. Perhaps being well practiced at personalizing their technology means they are more likely to continue this (more risk taking in LeAD's terminology):

*I'm not afraid to poke all the buttons and click all the settings and see what things do. I know I'm not going to break it and I can always reinstall it. ([Andy L, LexDis Case Study](#))*

*I had a fear of computers years and years ago.. and now when I see people who are worried about making mistakes I always say 'the first thing you need to do is overcome your fear and keep practicing! ([Ben, LexDis Case Study](#)).*

This group of learners demonstrated 'a diverse range of strategies using a pool of technologies that included standard assistive technologies and innovative ways of using mobile and interactive web 2.0 applications' Such agility takes time and disabled learners found time to be a 'constraint and a persistent worry'. (LeXDis, 2009, p. 2).

Of course, being able to operationalise their choices is dependent on university provision, sometimes at the most basic level, e.g.

*The big thing that came out of this for me is that it would really help if the lecturers put as much as they could in an electronic format. (LexDis)*

This group of learners had much to say about the enablers and barriers to learning, which would be of benefit to all learners, and are summarized in Section 5.

### **4.3 International students**

Technologies such as Skype and Facebook play an important role in enabling overseas students to adapt to an unfamiliar academic and social environment through keeping in touch with friends and family at home. (Thema & BLUPs)

Students from countries where the information transmission model of pedagogy dominates may find that it takes time to get used to small group learning and the emphasis on analytical thinking (Thema).

In relation to technology, students' provenance may also influence their reaction to institutional provision: e.g. US students used to blanket wireless coverage back home struggle with the patchy provision in Oxford, while those from developing countries are more likely to be content with the existing institutional support for technology (THEMA)

## **5. Supporting learners' development**

The previous discussion of learner differences has shown that, although there are some students who make good use of technology to support their learning experiences, this is not the case for all. Students do not enter into our educational institutions fully formed. And yet, there are enough examples of really good uses of technology for us to want to make some effort to develop all our learners to use these tools appropriately. We want to prepare learners for learning in a digital age.

We need then to look carefully at their development. Many of the discussions with learners about their development over time and the influence of their context, elicited specific examples of practical things which they felt had enabled or presented barriers to their development. These are summarized in Table 3 and illustrate vividly the value of seeing the world through learners' eyes. They are mapped against the levels of development proposed in the model for developing effective e-learners: access, skills, practices and conceptions

**Table 3. Enablers and barriers for learner's development**

Level	Examples from the projects of practices which enable development	Examples from the projects of practices which present barriers to development
<p><b>Access</b></p> <p>Learners have access to relevant technologies, resources and services. Having functional access might include issues of ownership, mobility, accessibility and time.</p>	<p>Resources that can be accessed anywhere via the institutional virtual learning environment (LeAD, BLUPS)</p> <p>Single sign-on access to a range of online services including email, VLE, online library resources (LeAD)</p> <p>Access to the university portal prior to arrival (LeAD)</p> <p>Providing resources in multiple formats (LeAD), including audio-visual (E4L)</p> <p>Access to applications that support audio and other media (BLUPS)</p> <p>Provision of spaces to plug in and network personal laptop (BLUPS) so can use own assistive technology (LexDis)</p> <p>Availability of campus loan laptops (BLUPS)</p> <p>Technical support for personally owned laptops (STROLL)</p> <p>Study materials that are downloadable including e-Books, university information that can be subscribed to for updating through RSS feeds (BLUPS)</p> <p>'Desktop Anywhere' provision by the university to allow work from off campus. (BLUPS)</p> <p>Course materials made available in electronic format (LeXDis)</p>	<p>Restrictions on access to social networking technologies (E4L)</p> <p>Lack of facilities for those using audio support applications, which require headphones and sufficient storage space for large files (BLUPS)</p> <p>Disabled learners are having less time compared to other students to work online due to time taken up coping with issues related to disability (LeXDis)</p> <p>Specialist software only being provided on fixed computers on site, with no restrictions on the use of these computers for accessing this software (LeAD &amp; BLUPS)</p> <p>Incompatibility across versions of software used by staff and students (BLUPS)</p> <p>University computers with unpredictable compatibility with USB memory sticks (BLUPS)</p> <p>IT services not set up to help distance learners (Thema)</p>

<b>Level</b>	<b>Examples from the projects of practices which enable development</b>	<b>Examples from the projects of practices which present barriers to development</b>
<p><b>Skills</b> (know how to do, generic for everyone)</p> <p>Learners develop generic technical, information, communication and learning skills.</p>	<p>Support from family and friends to develop basic IT skills. (STROLL)</p> <p>ECDL course and core modules in e.g. word processing (LeAD)</p> <p>Learning to touch type (LeAD)</p> <p>Guidance and training on how to access to key academic resources such as online journals, which is not confined to induction. (BLUPS)</p> <p>Training in the use of library services and required digital tools available when it is needed (Thema)</p> <p>Online training materials available (STROLL)</p> <p>Clear explanations about new technologies learners are expected to use, both in terms of how to use it and why it is of value. (Lead)</p>	<p>Lack of ‘technical literacy’ e.g. anti-virus updates, backups, installing software updates (LeAD)</p> <p>Heavy workloads, lack of time to develop even basic skills (Thema)</p> <p>Tutors assumptions that training and support is available to students and therefore not making useful suggestions themselves about online resources (BLUPS)</p> <p>Key information about e.g. IT training sent out at induction, an overwhelming time and lost in all this information (STROLL, Thema)</p> <p>IT training sessions run at same time as scheduled academic classes. (Thema)</p> <p>Staff not having the skills to use the technology appropriately (e4L) and inconsistency between staff (LeAD)</p>

<b>Level</b>	<b>Examples from the projects of practices which enable development</b>	<b>Examples from the projects of practices which present barriers to development</b>
<p><b>Practices</b> (personal strategies &amp; choices)</p> <p>Learners make informed choices about how to use technologies, alone and with others. They develop flexible strategies in response to situational needs.</p>	<p>Institutions need to provide flexibility and choice, acknowledging the many differences among learners (e4L)</p> <p>Tutors allowing, even encouraging learners to develop their personal practices e.g. allowing teaching sessions to be recorded. (BLUPS)</p> <p>Materials available for downloading to PDA, facilitating short study bursts in multiple locations (PB-LXP)</p> <p>Recommendations from peers about technologies to use e.g. Google docs to compile a report for a group project (STROLL).</p> <p>Accessing materials from other academic sites (BLUPS, STROLL, Thema)</p>	<p>Lack of confidence to explore new tools and resources (LeAD)</p> <p>A low awareness of the potential role of Web 2.0 in managing their learning (Thema)</p> <p>Patchy wireless coverage limiting choices about where to study. (Thema)</p> <p>Lack of tutor skills e.g. having to print things out for tutor to read (BLUPS)</p> <p>Time pressures limiting ability to try out new tools, particularly for learners with disabilities (LeXDis) and international students (Thema)</p> <p>Difficulties in establishing network in new halls of residence or home increasing isolation from home and family (LeAD, Thema)</p>
<p><b>Creative appropriation</b></p> <p>Learners' conceptions of the role of technology allow them to make use of the skills and practices they have developed to create their own learning environments.</p>	<p>Being practised in making decisions about which technology to use for which purpose e.g. assistive technology (LeXDis)</p> <p>Learners who think technology is more useful in their work context are more likely to use more types and amount of technology (PB-LXP)</p> <p>Using multiple identities to separate work, study and home commitments (Thema)</p> <p>Familiarity with functionality of personal technology, to allow for creative use (STROLL)</p>	<p>Learners' expectations for innovative uses of technology are limited by a lack of prior experience and knowledge of what university can offer. They are not pushing for the use of particular technologies and have no clear vision of a technology-rich education (LeAD)</p> <p>Learners adopt a cautious, conservative, low risk approach to studying when the risks are high (LeAD)</p>

## 6. Summary

These projects have confirmed that learners have access to a great deal of technology and are, in general, confident in its use. We have supported the findings from Phase 1 that learners use technology widely for leisure, and in terms of its relationship to learners, they use technology to derive support from friends and colleagues and to access information. We have additionally uncovered the complexity of learners' lives and their use on technology to aid flexible study. Learners are managing home, work, family and study and many told their stories of how hard they study and the personal sacrifices they make in order to do so. Here it is not that technology is used to aid study, but that learners have a reliance on technology to enable them to manage the competing demands in their lives. Some learners are also using technology to meet a specific need, which may be related to their own specific learning requirements or the context of the course. It is worth noting that there remains a small proportion of students who are not skilled technology users and feel disadvantaged by their lack of familiarity with technology. Institutions and teachers will need to be aware of the needs of this group of learners.

This report has focused on explaining some of the individual differences between learners which have been remarked up in earlier work. These studies enabled us to assess changes over which could explain some of the differences seen. There was some evidence of learners developing in the sophistication of their technology use while in education, particularly, in their use of library and electronic information sources. The timing of these projects meant that they were following learners alongside the emergence of web 2.0 technology. Although there were individual voices who were making use this in creative ways, for most learners it had little impact on their learning experience. Some projects noted that although it wasn't part of the original aims of their studies, they suspected that changes over time were related to progression in the development of learning skills and independence, which had an impact on technology use. We found it more difficult than expected to uncover the choices learners make about which technologies to use in which situations and how those choices changed over time. As learners increasingly use technologies to meet their own needs and the demands of their context, it is important that we support them in making good choices.

At the end of Phase 1, we proposed a pyramid model of as a way of understanding how effective e-learners can be developed (Support & Synthesis, 2008). The general idea that the attributes and identities of effective learners are built on a set of technology-based practices appears to stand. We used the module to map barriers and enablers for learner development as they progress and made some amendments to the model in light of the new evidence:

- At stage 1, Access, have seen that at learners need both access to relevant technologies, resources and services and functional access, which might include issues of ownership, mobility, accessibility and time.
- At stage 2, Skills, there have been many examples of the skills learners need to use technology effectively including information handling skills, and organizational and learning skills.

- Stage 3 is renamed Practices. Where skills are generic (everyone needs to do this) Practices are more personal. It is at this stage that choices become important.
- At stage 4, we have highlighted the few examples we found of creative appropriation and noted that it is learners' conceptions of the role of technology which seems to allow them to make use of the skills and practices they have developed

However, the examples of creative appropriation were not common. Most learners, despite access to technology and self-reported confidence, aren't appropriating the technology they know into their study. There is an important future research issue here; to what extent (and how) do learners assimilate technologies they are introduced to for a specific course of study, and use them for their own personal ends?

We are convinced that there is still a need for this kind of model and hope it will be of use to all those who are responsible for learners' development in various roles. We saw that learner differences can also be explained by context, which seems to be hugely important. Learners are clear that most of their technology use for learning is defined by the courses and tutors. The powerful influence of context means that teachers and their institutions need to take the lead in developing learners, including meeting the need for staff development.

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